Title: CONTROL SYSTEM
Inventor: Yuji YASUI et al.
Appln. No. : New Application
Docket No.: 108419-00079

FIG. 1

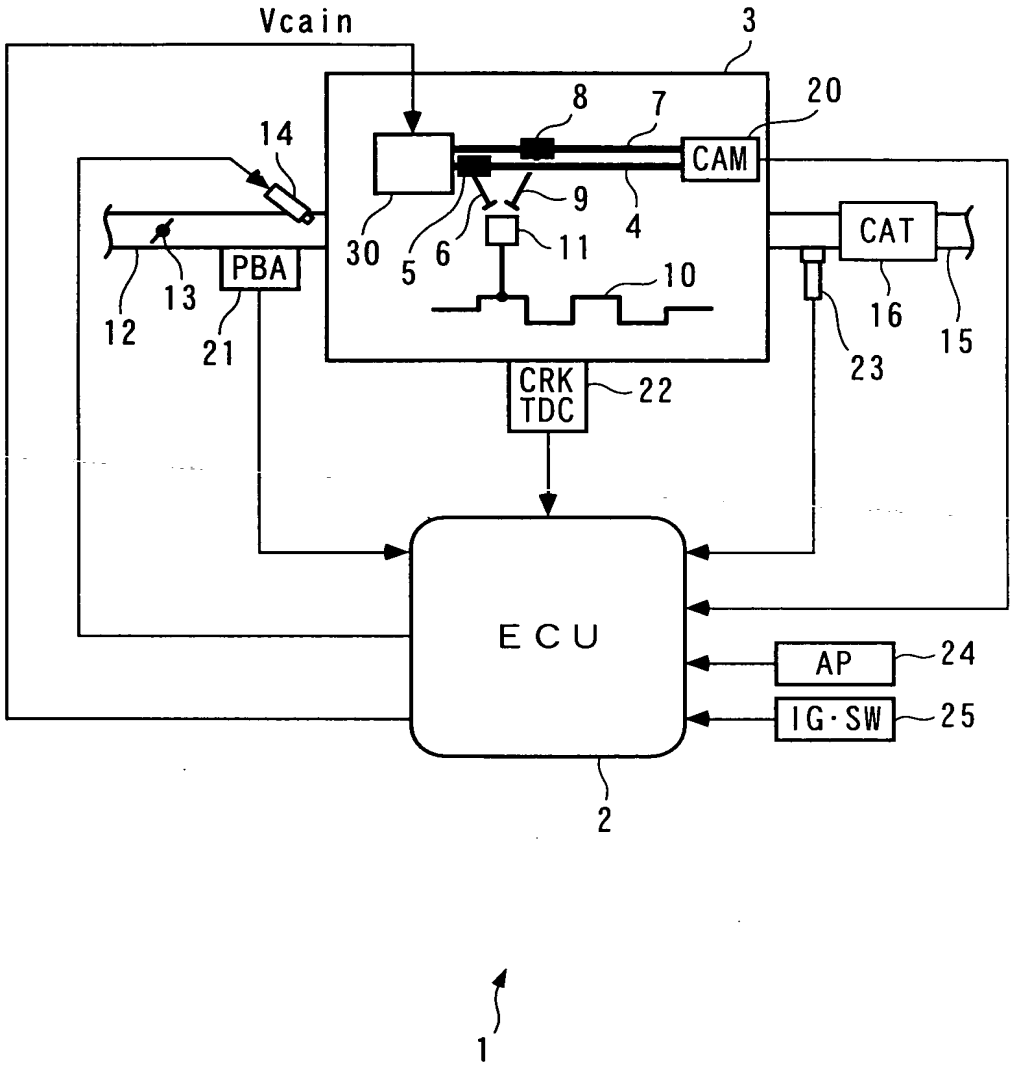

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FIG. 2

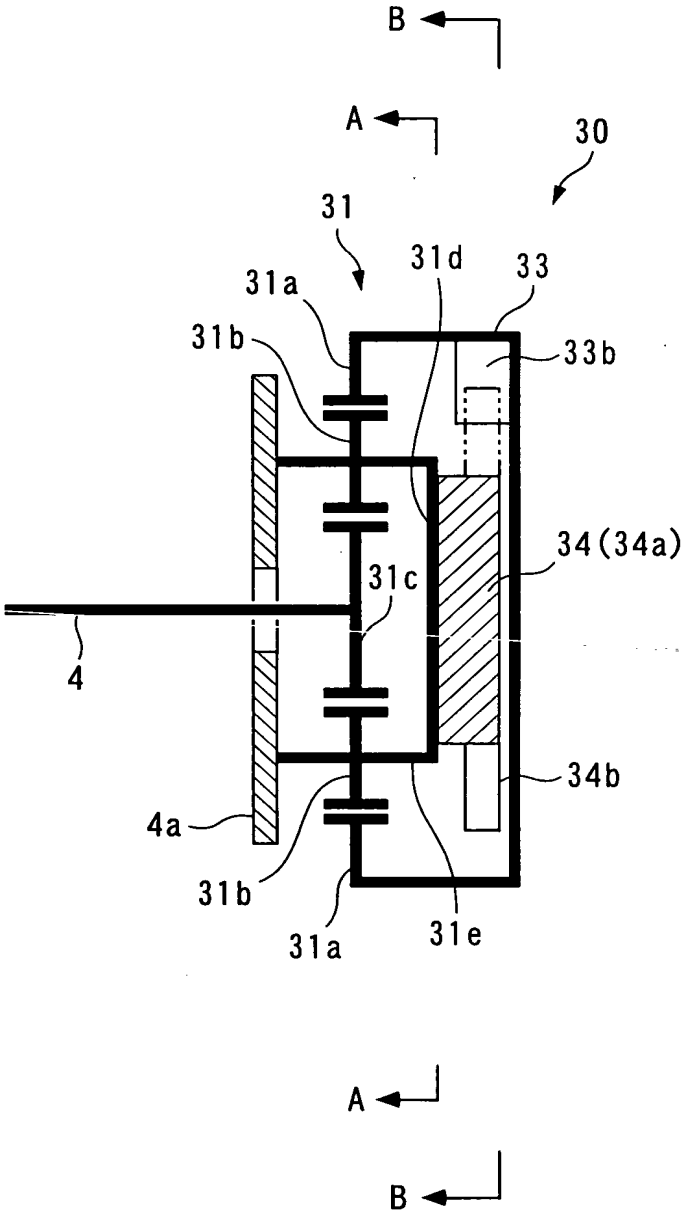

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FIG. 3

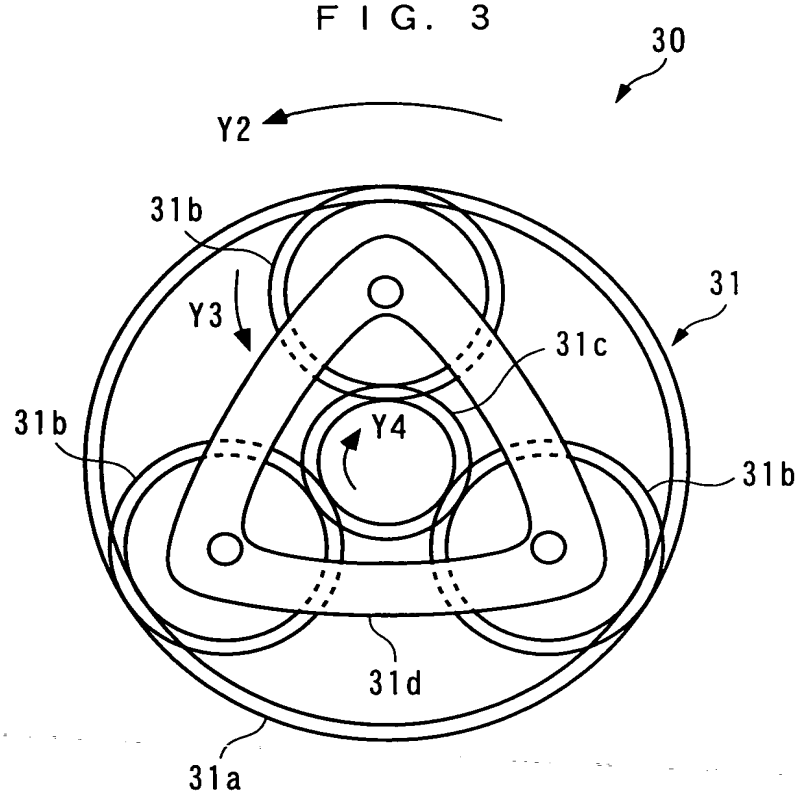

FIG. 4

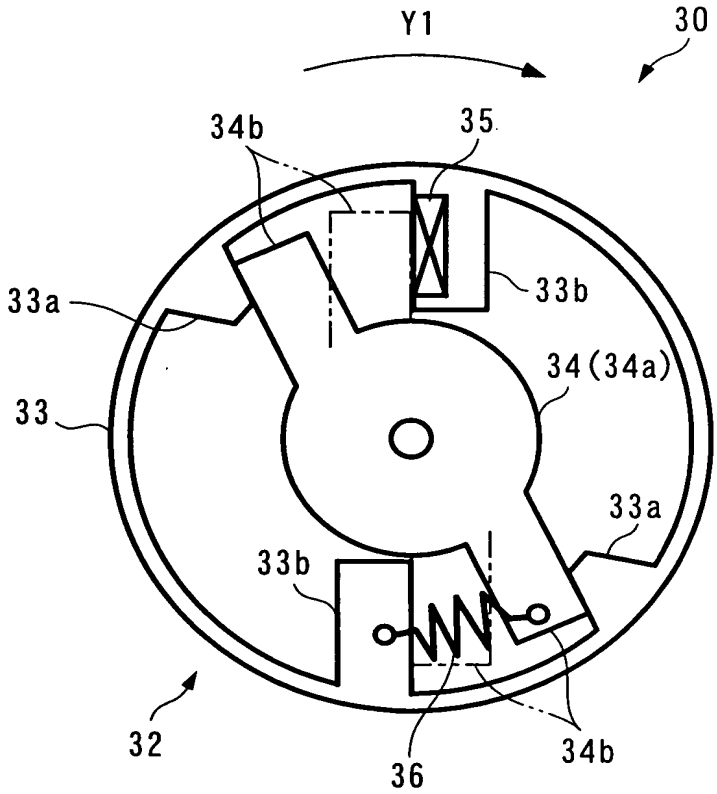

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FIG. 5

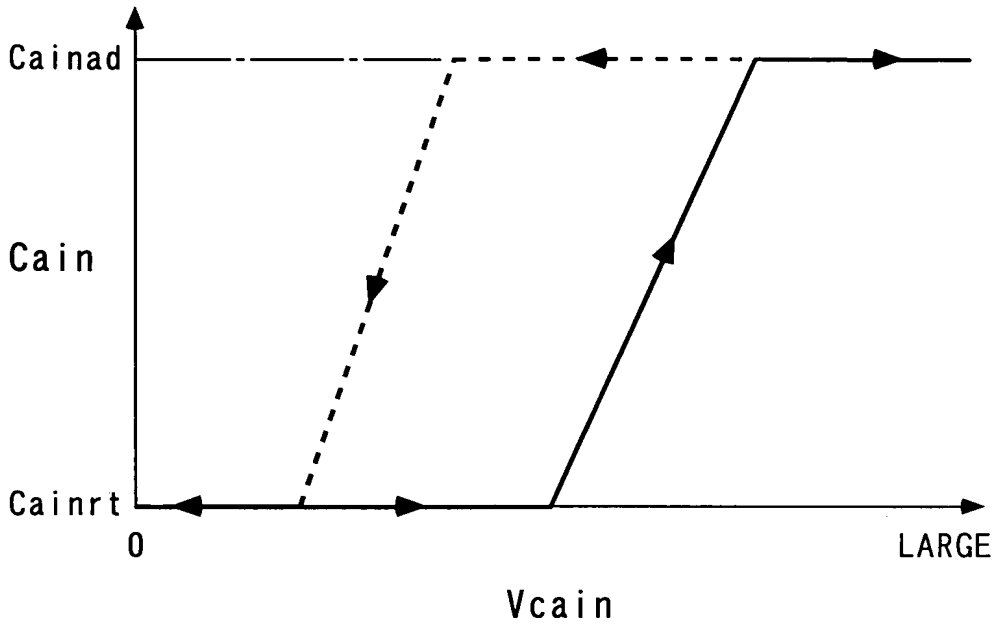

FIG. 6

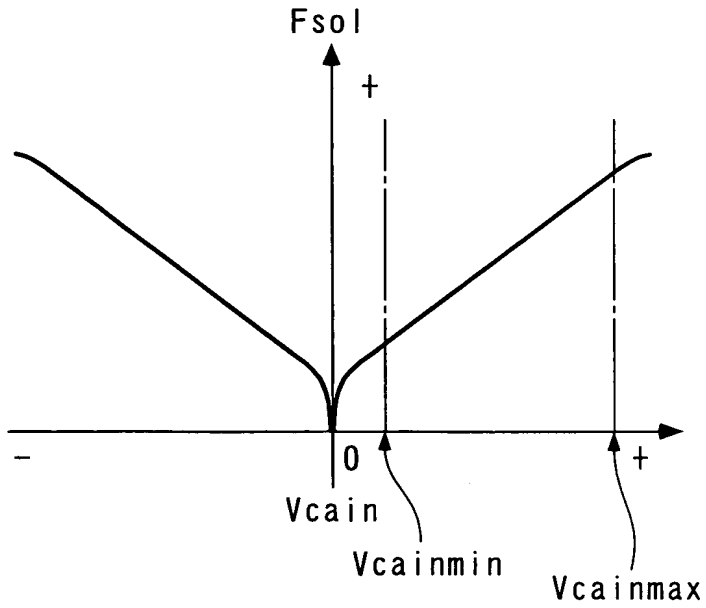

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FIG. 7

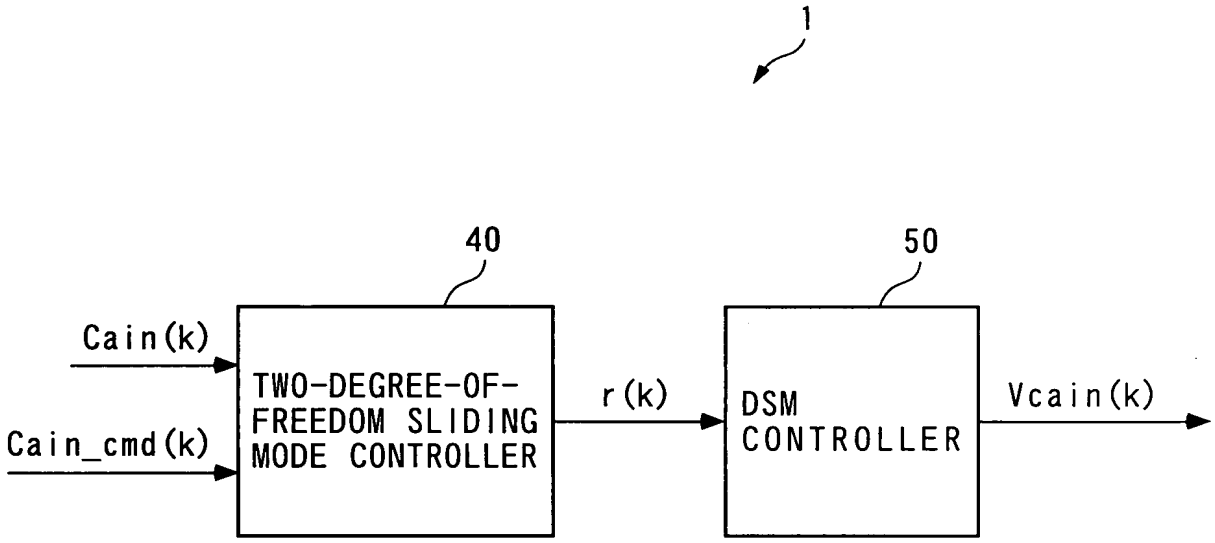

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FIG. 8

$$r(k)=rff(k)+rrch(k)+radp(k)+rdamp(k) \quad \cdots\cdots (1)$$

$$rff(k)=Cain\_cmd\_f(k)+(1-POLE)\cdot Cain\_cmd\_f(k-1)-POLE\cdot Cain\_cmd\_f(k-2) \quad \cdots\cdots (2)$$

$$rrch(k)=-Krch\cdot\sigma s(k) \quad \cdots\cdots (3)$$

$$radp(k)=-Kadp\cdot\sum_{i=0}^{k}\sigma s(i) \quad \cdots\cdots (4)$$

$$rdamp(k)=-Kdamp\cdot[Cain(k)-Cain(k-1)] \quad \cdots\cdots (5)$$

$$\sigma s(k)=e(k)+POLE\cdot e(k-1) \quad \cdots\cdots (6)$$

$$e(k)=Cain(k)-Cain\_cmd\_f(k-1) \quad \cdots\cdots (7)$$

$$Cain\_cmd\_f(k)=-POLE\_f\cdot Cain\_cmd\_f(k-1)+(1+POLE\_f)\cdot Cain\_cmd(k) \quad \cdots\cdots (8)$$

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FIG. 9

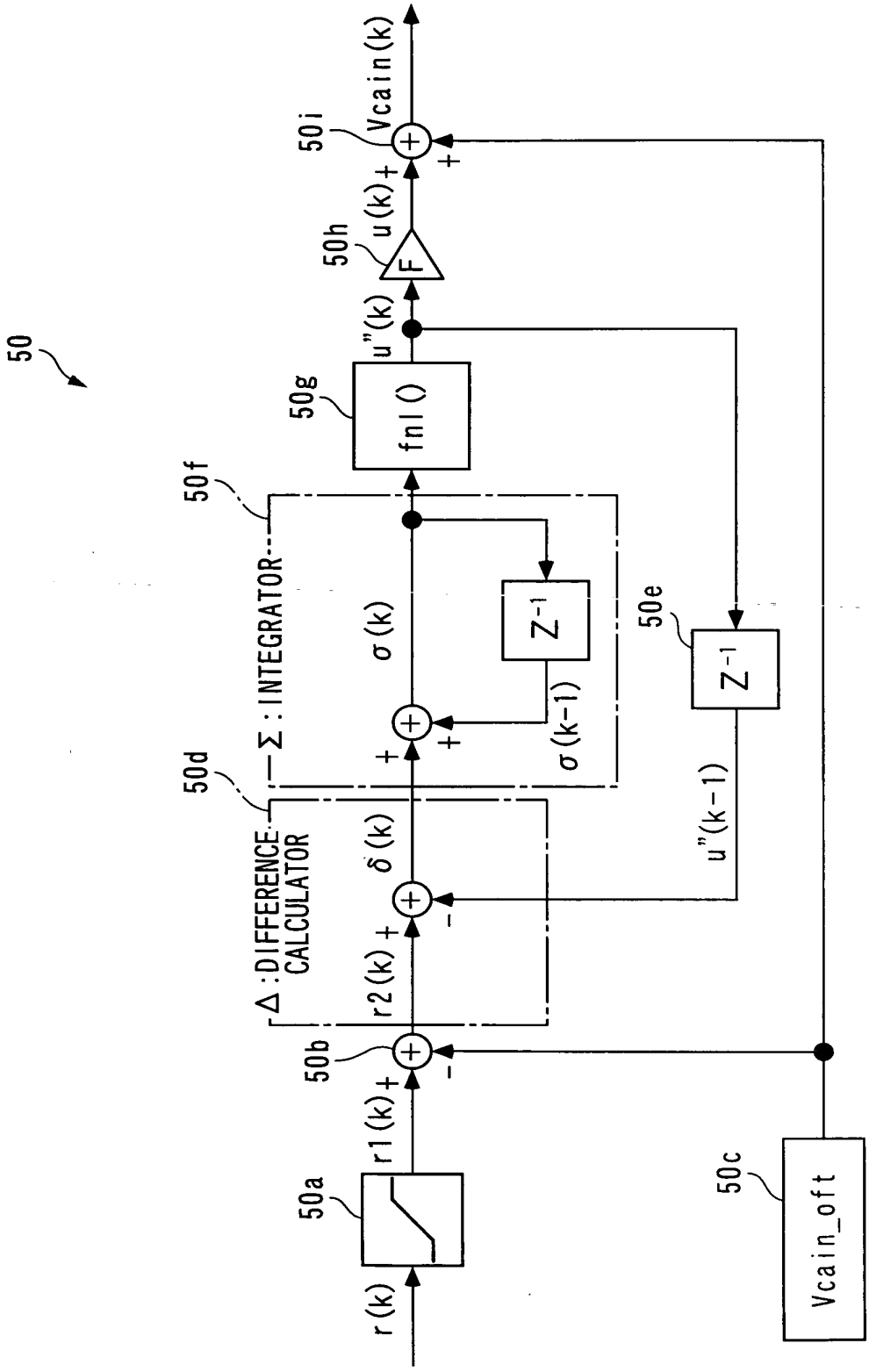

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FIG. 10

$$r1(k)=Lim(r(k)) \quad \cdots\cdots (9)$$

$$r2(k)=r1(k)-Vcain\_oft \quad \cdots\cdots (10)$$

$$\delta(k)=r2(k)-u''(k-1) \quad \cdots\cdots (11)$$

$$\sigma(k)=\sigma(k-1)+\delta(k) \quad \cdots\cdots (12)$$

$$u''(k)=fnl(\sigma(k)) \quad \cdots\cdots (13)$$

$$u(k)=KDSM\cdot u''(k) \quad \cdots\cdots (14)$$

$$Vcain(k)=Vcain\_oft+u(k) \quad \cdots\cdots (15)$$

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FIG. 11

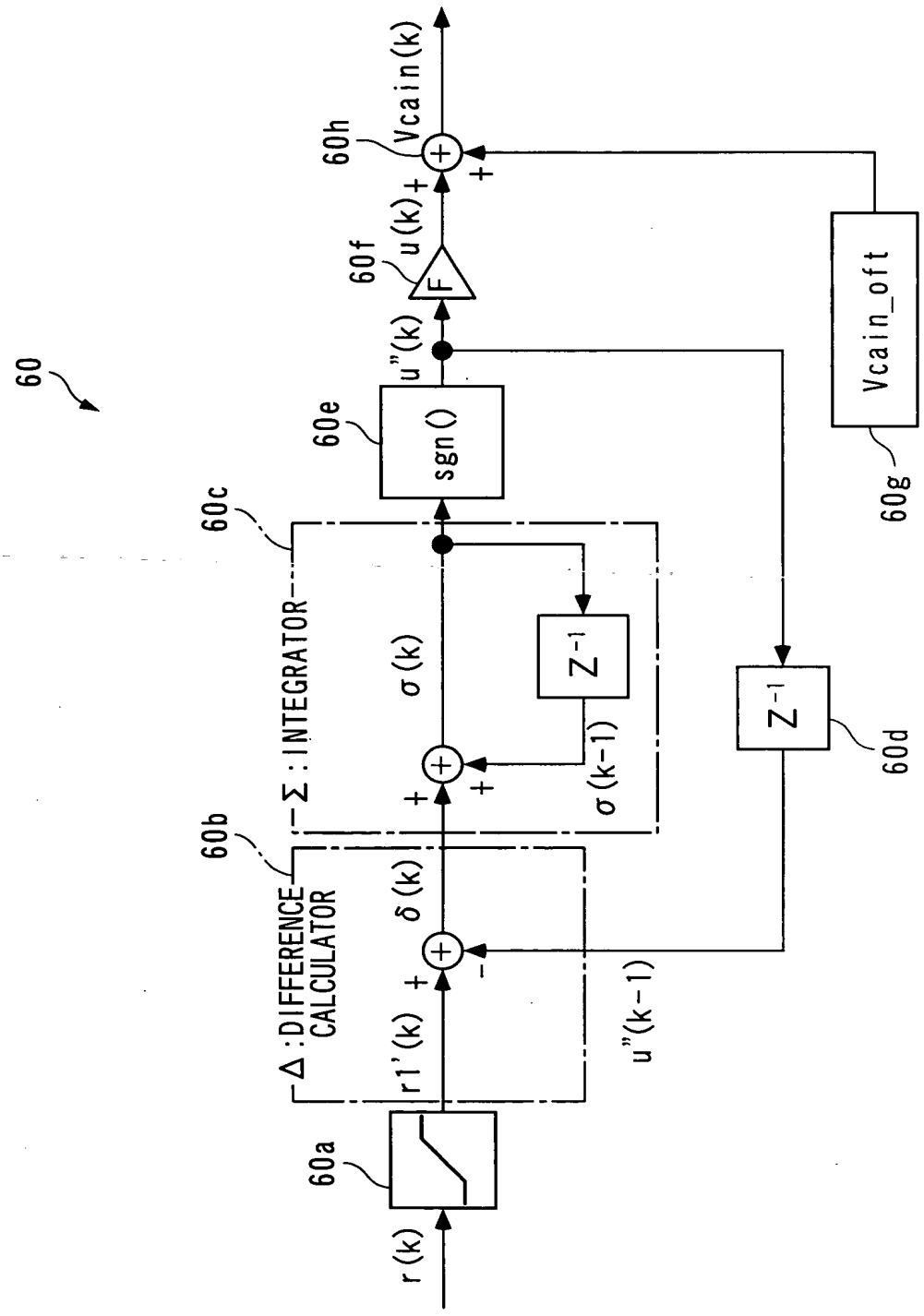

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FIG. 12

$$r1'(k)=sat(r(k)) \quad \cdots\cdots (16)$$

$$\delta(k)=r1'(k)-u''(k-1) \quad \cdots\cdots (17)$$

$$\sigma(k)=\sigma(k-1)+\delta(k) \quad \cdots\cdots (18)$$

$$u''(k)=sgn(\sigma(k)) \quad \cdots\cdots (19)$$

$$u(k)=KDSM\cdot u''(k) \quad \cdots\cdots (20)$$

$$Vcain(k)=Vcain\_oft+u(k) \quad \cdots\cdots (21)$$

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FIG. 13

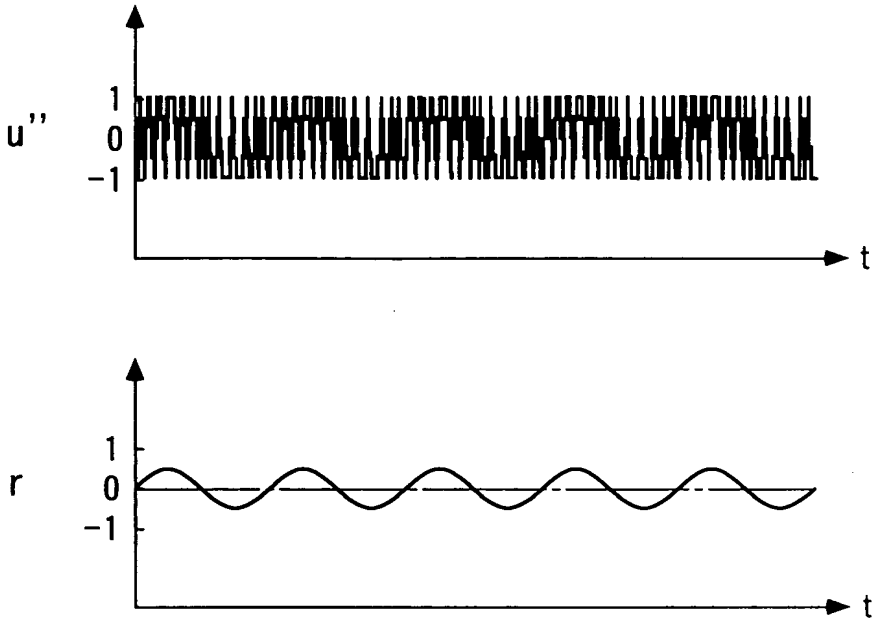

FIG. 14

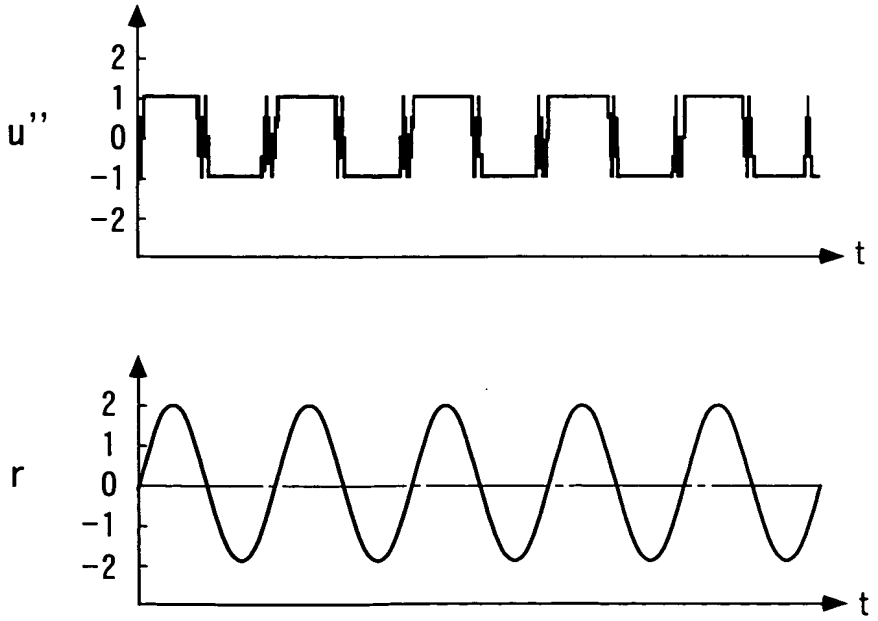

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FIG. 15

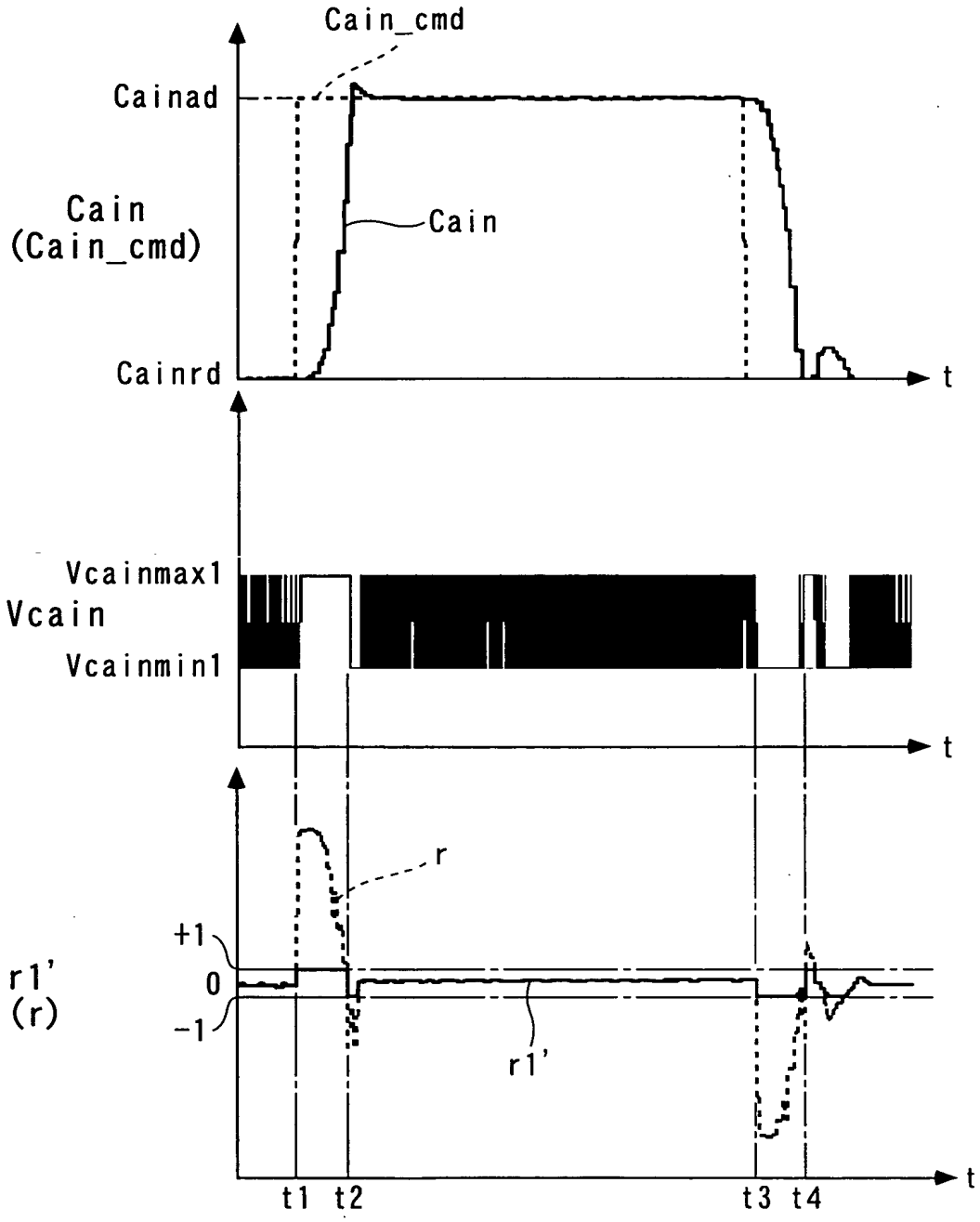

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FIG. 16

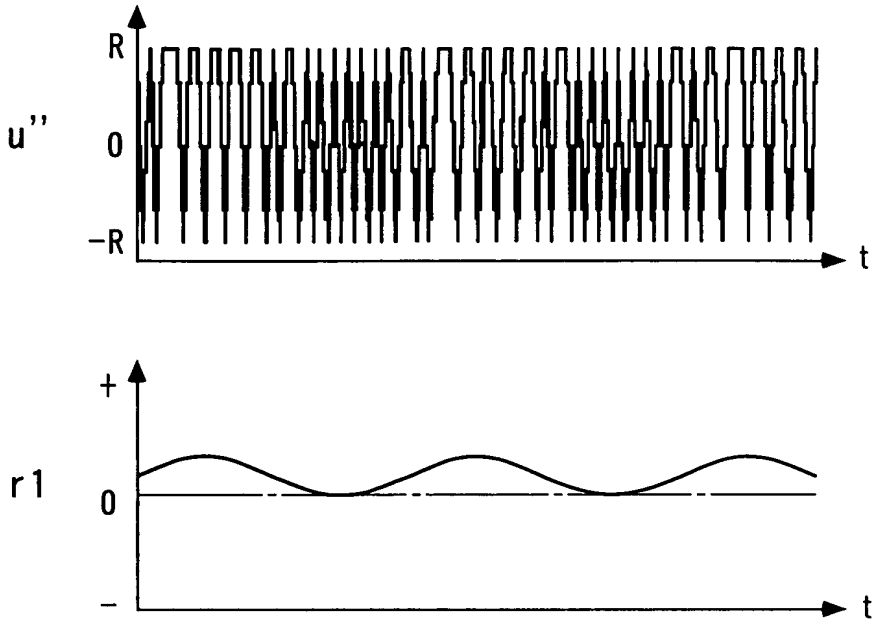

FIG. 17

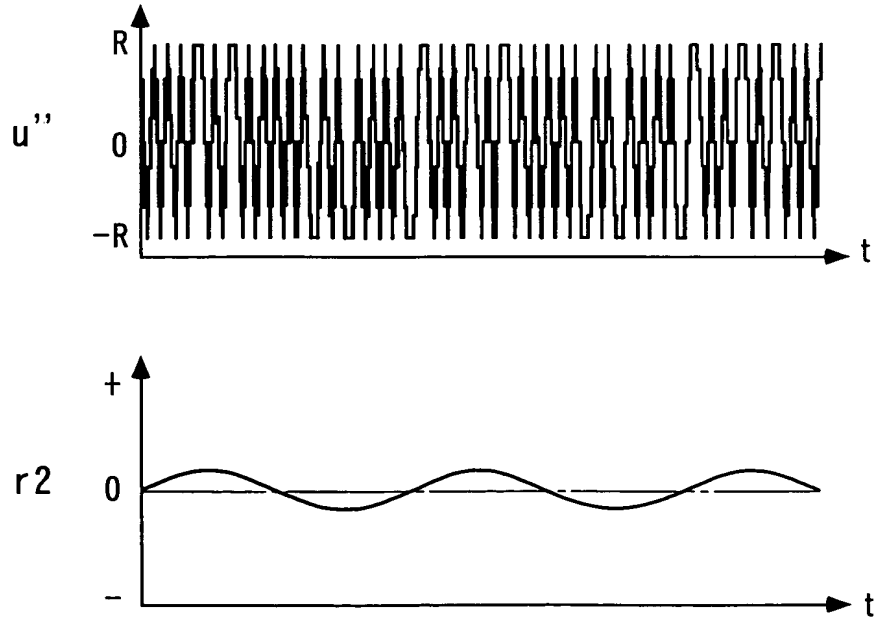

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FIG. 18

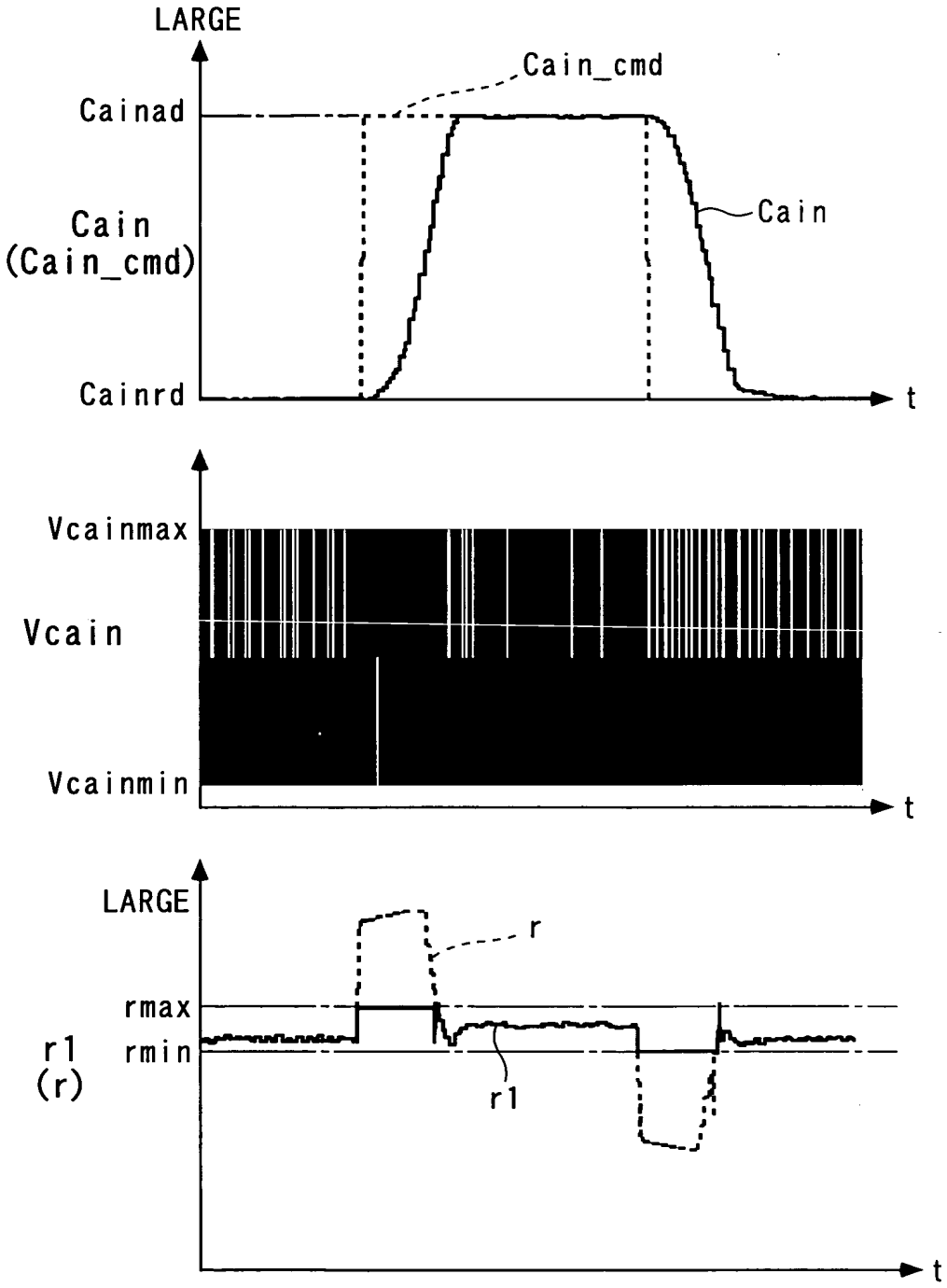

FIG. 19

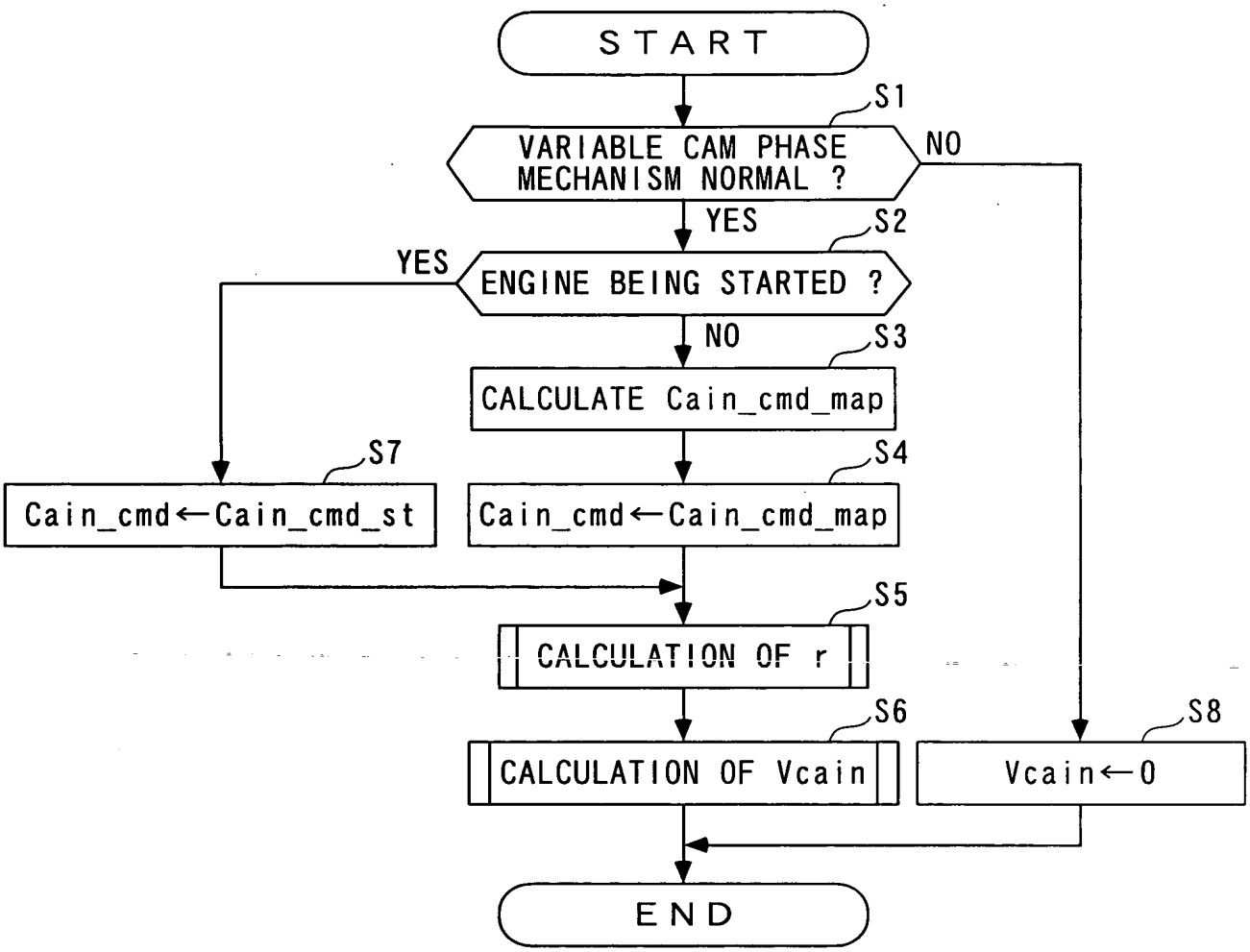
START
S1
VARIABLE CAM PHASE MECHANISM NORMAL ?
NO
YES
S2
YES
ENGINE BEING STARTED ?
NO
S3
CALCULATE Cain_cmd_map
S7
S4
Cain_cmd←Cain_cmd_st
Cain_cmd←Cain_cmd_map
S5
CALCULATION OF r
S6
S8
CALCULATION OF Vcain
Vcain←0
END

FIG. 20

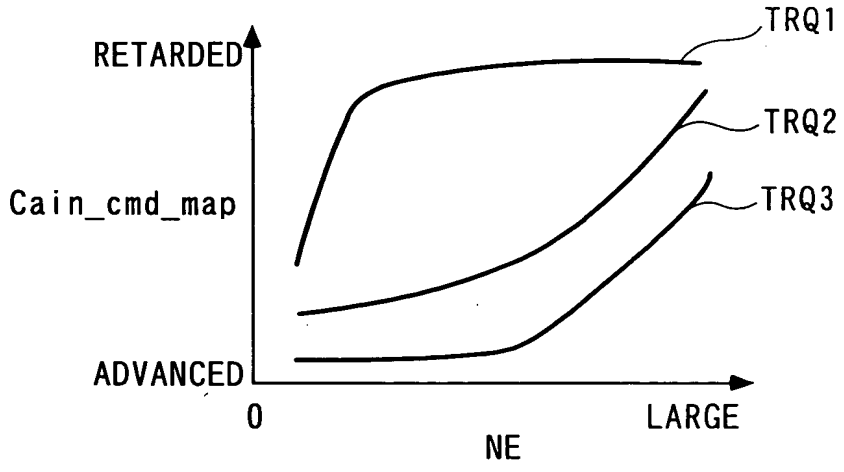
TRQ1
TRQ2
TRQ3
RETARDED
Cain_cmd_map
ADVANCED
0
LARGE
NE

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FIG. 21

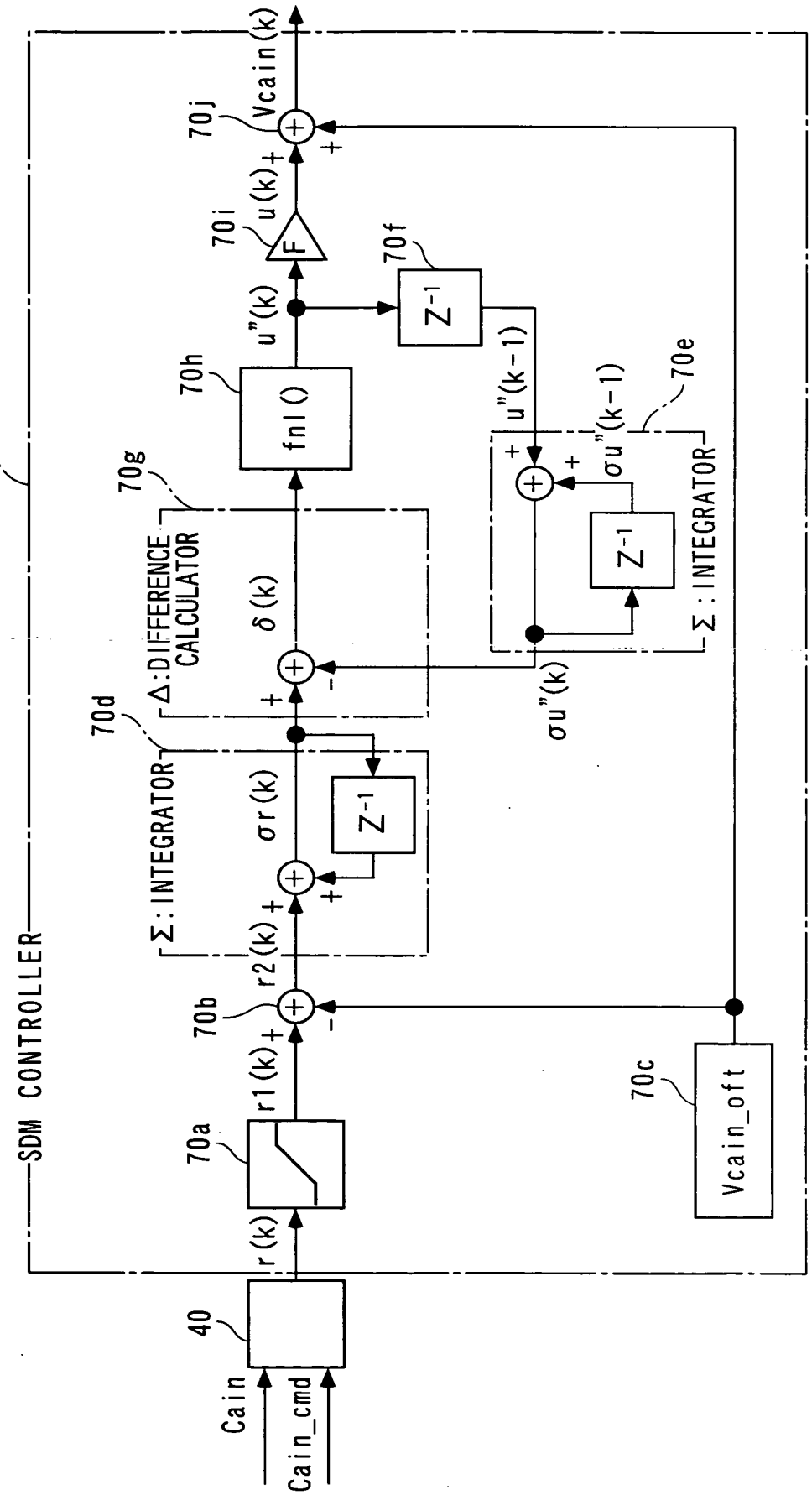

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FIG. 22

$$r1(k)=Lim(r(k)) \quad \cdots\cdots (22)$$

$$r2(k)=r1(k)-Vcain\_oft \quad \cdots\cdots (23)$$

$$\sigma r(k)=\sigma r(k-1)+r2(k) \quad \cdots\cdots (24)$$

$$\sigma u''(k)=\sigma u''(k-1)+u''(k-1) \quad \cdots\cdots (25)$$

$$\delta(k)=\sigma r(k)-\sigma u''(k) \quad \cdots\cdots (26)$$

$$u''(k)=fnl(\delta(k)) \quad \cdots\cdots (27)$$

$$u(k)=KDSM\cdot u''(k) \quad \cdots\cdots (28)$$

$$Vcain(k)=Vcain\_oft+u(k) \quad \cdots\cdots (29)$$

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FIG. 23

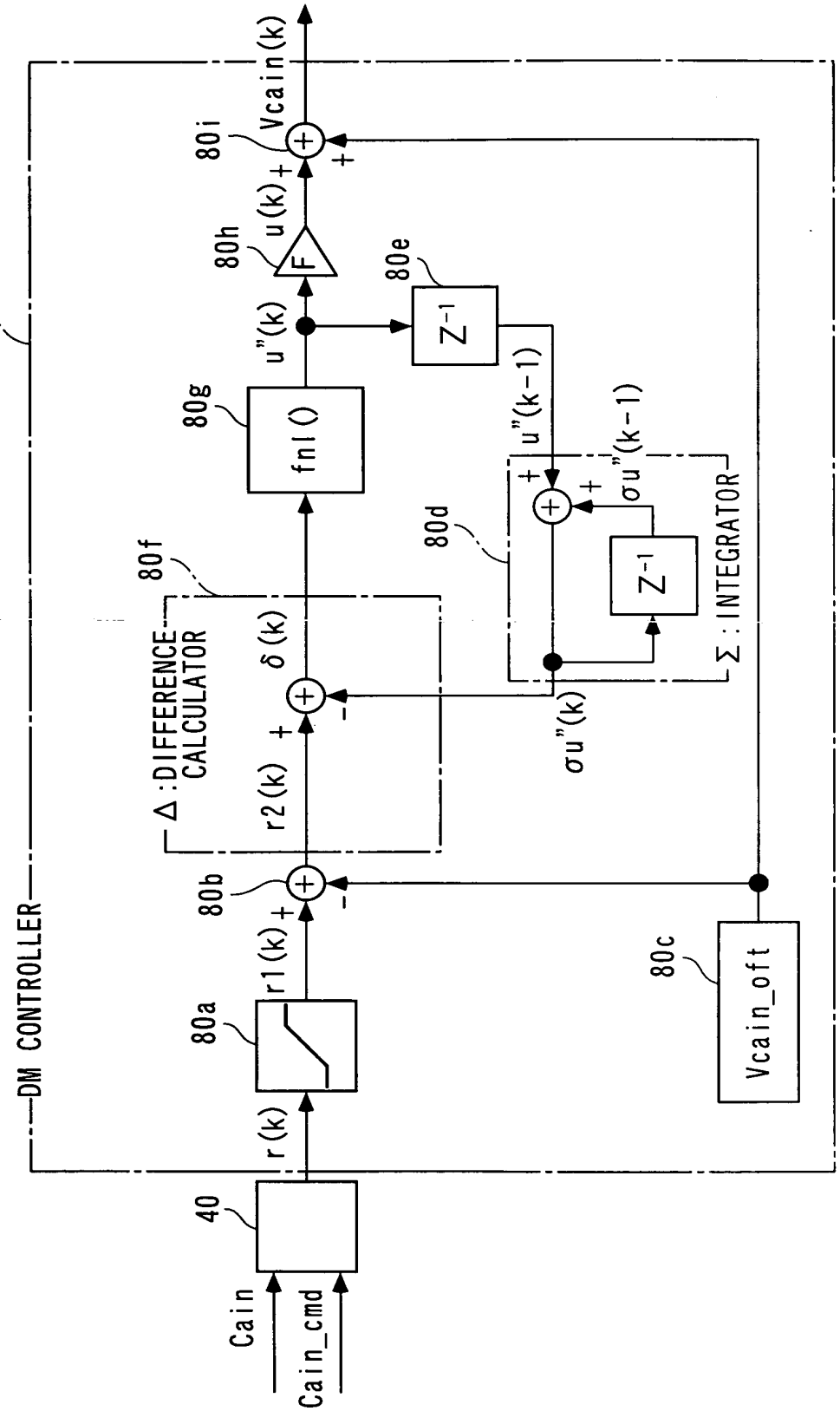

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FIG. 24

$$r1(k)=Lim(r(k)) \quad \cdots\cdots (30)$$

$$r2(k)=r1(k)-Vcain\_oft \quad \cdots\cdots (31)$$

$$\sigma u''(k)=\sigma u''(k-1)+u''(k-1) \quad \cdots\cdots (32)$$

$$\delta(k)=r2(k)-\sigma u''(k) \quad \cdots\cdots (33)$$

$$u''(k)=fnl(\delta(k)) \quad \cdots\cdots (34)$$

$$u(k)=KDSM\cdot u''(k) \quad \cdots\cdots (35)$$

$$Vcain(k)=Vcain\_oft+u(k) \quad \cdots\cdots (36)$$

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FIG. 25